

CLAIMSWhat is Claimed is:

- 1           1.     An imaging system for a vehicle, said system comprising:  
2                 an infrared source generating an infrared beam along a particular field-of-  
3 view in or around the vehicle;  
4                 an infrared detector responsive to infrared radiation reflected from objects  
5 in the field-of-view of the infrared beam, said detector generating image signals from  
6 the reflected infrared radiation; and  
7                 a processor responsive to the image signals from the detector, said  
8 processor including face recognition software that acquires and tracks facial features of  
9 a person from the image signals, said processor causing a vehicle operation to be  
10 performed if a person's face is detected.
- 1           2.     The system according to claim 1 wherein the processor compares a  
2 detected image of a person's face with stored images to identify the person.
- 1           3.     The system according to claim 2 wherein the system is a driver  
2 identification system, said processor identifying a driver's face and causing a vehicle  
3 door to automatically unlock if the driver's face is detected.

1 4. The system according to claim 2 wherein the system is a driver  
2 identification system, said system identifying a driver's face, said system monitoring  
3 driver gestures to perform a particular vehicle function if the driver's face is detected.

1 5. The system according to claim 1 wherein the system is a vehicle  
2 convenience system, said processor identifying a person's face and causing a vehicle  
3 system to be automatically adjusted in response to detecting the person's face.

1 6. The system according to claim 2 wherein the system records the person's  
2 face if it does not match a face stored in the processor.

1 7. The system according to claim 2 wherein the processor causes the  
2 vehicle to start if the detected image matches a particular stored image.

1 8. The system according to claim 2 wherein the processor controls the  
2 vehicle speed if a detected image is of a particular person's face that is stored.

1 9. The system according to claim 1 wherein the processor tracks and  
2 monitors the persons eyes.

1 10. The system according to claim 1 further comprising an infrared filter  
2 positioned in front of the detector.

1 11. The system according to claim 1 wherein the infrared detector includes a  
2 pixel array of photodiodes.

1 12. The system according to claim 1 wherein the infrared source is pulsed on  
2 for a predetermined time at predetermined intervals.

1 13. The system according to claim 12 wherein the pulsed source and the  
2 detector are synchronized such that a difference of successive frames represents an  
3 image free of ambient light variations.

1 14. The system according to claim 1 wherein the detector includes a pixel  
2 array of diodes.

1 15. A driver imaging and identification system for use in a vehicle, said  
2 system comprising:

3 an infrared source generating an infrared beam along a particular field-of-  
4 view in or around the vehicle, wherein the infrared source is pulsed on and off at  
5 predetermined intervals;

6 an infrared detector responsive to infrared radiation reflected from objects  
7 in the field-of-view of the infrared beam, said detector generating image signals from  
8 the reflected radiation; and

9 a processor responsive to the image signals from the detector, said  
10 processor including face recognition software that acquires and tracks facial features of

11 a person from the image signals and compares a detected image of a person's face  
12 with stored images to identify the person, said processor identifying a driver's face from  
13 the comparison and causing a vehicle door to automatically unlock if the driver's face is  
14 detected.

1 16. An intruder detection system for use in a vehicle, said system comprising:  
2 an infrared source generating an infrared beam along a particular field-of-  
3 view in or around the vehicle, wherein the infrared source is pulsed on and off at  
4 predetermined intervals;

5 an infrared detector responsive to infrared radiation reflected from objects in  
6 the field-of-view of the infrared beam, said detector generating image signals from the  
7 reflected radiation; and

8 a processor responsive to the image signals from the detector, said  
9 processor including face recognition software that acquires and tracks facial features of a  
10 person from the image signals and compares a detected image of a person's face with  
11 stored images to identify the person, wherein if the identified face does not match a  
12 stored image, the processor causes an alarm to sound.

1 17. The system according to claim 16 wherein the processor provides a  
2 recording of the image if the detected image does not match a stored image.

1 18. A driver convenience system for use in a vehicle, said system comprising:  
2 an infrared source generating an infrared beam along a particular field-of-

3 view in or around the vehicle, wherein the infrared source is pulsed on and off at  
4 predetermined intervals;

5 an infrared detector responsive to infrared radiation reflected from objects in  
6 the field-of-view in or around the vehicle;

7 an infrared detector responsive to infrared radiation reflected from objects in  
8 the field-of-view of the infrared beam, said detector generating image signals from the  
9 reflected radiation; and

10 a processor responsive to the image signals from the detector, said  
11 processor including face recognition software that acquires and tracks facial features of a  
12 person from the image signals and compares a detected image of a person's face with  
13 stored images to identify the person, said processor causing a vehicle system to be  
14 automatically set in response to detecting the person's face.

15 19. A driver imaging and identification system for use in a vehicle, said  
16 system comprising:

17 an infrared source generating an infrared beam along a particular field-of-  
18 view in or around the vehicle, wherein the infrared source is pulsed on and off at  
19 predetermined intervals;

20 an infrared detector responsive to infrared radiation reflected from objects  
21 in the field-of-view of the infrared beam, said detector generating image signals from  
22 the reflected radiation; and

23 a processor responsive to the image signals from the detector, said  
24 processor including face recognition software that acquires and tracks facial features of

11 a person from the image signals and compares a detected image of a person's face  
12 with stored images to identify the person, said processor identifying a driver's face from  
13 the comparison and monitoring driver commands to perform a particular vehicle  
14 function.

1 20. The system according to claim 19 wherein the processor detects the person  
2 after the vehicle is locked.

1 21. A driver convenience system for use in a vehicle, said system comprising:  
2 an infrared source generating an infrared beam along a particular field-of-  
3 view in or around the vehicle, wherein the infrared source is pulsed on and off at  
4 predetermined intervals;

5 an infrared detector responsive to infrared radiation reflected from objects in  
6 the field-of-view in or around the vehicle;

7 an infrared detector responsive to infrared radiation reflected from objects in  
8 the field-of-view of the infrared beam, said detector generating image signals from the  
9 reflected radiation; and

10 a processor responsive to the image signals from the detector, said  
11 processor including face recognition software that acquires and tracks facial features of a  
12 person from the image signals and compares a detected image of a person's face with  
13 stored images to identify the person, said processor causing the vehicle to start if the  
14 detected image is determined to be the vehicle driver.

1           22.   A driver convenience system for use in a vehicle, said system comprising:  
2                   an infrared source generating an infrared beam along a particular field-of-  
3 view in or around the vehicle, wherein the infrared source is pulsed on and off at  
4 predetermined intervals;  
5                   an infrared detector responsive to infrared radiation reflected from objects in  
6 the field-of-view in or around the vehicle;  
7                   an infrared detector responsive to infrared radiation reflected from objects in  
8 the field-of-view of the infrared beam, said detector generating image signals from the  
9 reflected radiation; and  
10                  a processor responsive to the image signals from the detector, said  
11 processor including face recognition software that acquires and tracks facial features of a  
12 person from the image signals and compares a detected image of a person's face with  
13 stored images to identify the person, said processor causing the vehicle speed to be  
14 controlled in response to detecting a particular person.

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